been put to the test by the construction at Brooklyn of one of a pair of the largest battleships so far built for our navy; and the question naturally arises, How far have the predictions of the former Chief Constructor been verified? In answer, it can be said that the "Connecticut," in spite of the strenuous efforts of the private firm which was building the sister ship "Louisiana," was completed within the same time as that ship, and within two or three months less time than called for by the contract. Because of the fact that hours are shorter, and the pay somewhat higher in the government yards, no claim was ever made that the "Connecticut" could be built as cheaply as the "Louisiana." It was estimated that she would cost about ten per cent more than the other ship. As a matter of fact, in the final summing of the costs, it was found that she cost only five per cent more. The latest official report of the Navy Department gives the total cost of the two ships to September 30, 1907—the figures including the expense of alterations chargeable to original construction, and also of armor and permanent ordnance fittings—as follows: For the "Connecticut," $6,367,308.22; for the "Louisiana," $6,037,-214.47.

The question may be raised as to whether as good a ship can be built at our navy yards as at the private yards. Perhaps the most conclusive test of this point is to compare the actual cost of repairs on these two ships since their completion. Fortunately, the figures are available; for the same report gives the cost of such repairs for the "Connecticut" as $44,314.56, and for the "Louisiana" as $110,500.19, a difference of about 17 per cent in favor of the "Connecticut." As a matter of fact, the comparison is more favorable than appears on the face, and this for the reason that the totals for the "Connecticut" include repairs made necessary by her having been run aground during the past summer, an accident which, of course, is in no sense chargeable to the quality of the work of the ship itself.

In regard to the five per cent increased cost of the "Connecticut," it is but fair to draw attention to the fact that, while being the first large battleship to be built at the Brooklyn navy yard, there are several items of cost charged to her, which would not appear against any subsequent battleship built upon the same ways. These are expenses due to work of a preparatory kind, as the provision of special tools in the machine shops and special appliances in the yard, which, once built, will be available for subsequent ships.

This preparation of slip cribbing and scaffolding cost over $25,000 for the "Connecticut," as against $12,000 for the "Louisiana" so also the cost of preparing launching ways and launching the ship cost over ten per cent more for the navy yard ship. There would be no such difference in the case of the next battleship to be built on these same launching ways. Again, in the preparation of beds and erecting, the list shows a cost of $12,000 or about 100 per cent more for the "Connecticut." This item probably refers to the beds on which the engines were built; yet these beds are now a part of the permanent plant of the erecting shop, and indeed, are now being used for building the engines for the collier "Vestal." It would be possible to follow this comparison further if we had time, and show that if the cost of these preliminary preparations and of special tools and appliances were charged to the plant of the yard, to which they properly belong, the difference of five per cent between the "Connecticut" and "Louisiana" would be not a little reduced.

A NEW COIN COUNTER.

A new coin counting device has been perfected, which is claimed to possess several advantages over the older forms of this machine. In brief, the new coin counter assorts, counts and delivers accurately in regulation bank packages, nickels, dimes, quarters, and half-dollars, and in one-fifth to one-tenth the time necessary to do the work by hand. All the operations are carried on simultaneously, and the machine is complete in itself, no extra parts being necessary for the manufacture of wrappers, or for any other portion of the work. The amounts in the packages may be varied to meet the requirements, and every coin can be followed by the operator from the time it enters the apparatus until it is delivered and counted. Canadian nickels, 20-cent pieces, and quarters, and badly mutilated coins of our own money, are automatically sorted out and rejected.

THE ECONOMIC WASTE OF ACCIDENTS.

A friend of the American Museum of Safety Devices and Industrial Hygiene has offered a prize of $100 for the best essay on the Economic Waste of Accidents. The committee of award consists of Richard Watson Gilder, George Gilmour, and W. H. Tolman. Prof. F. R. Hutton, past president of the American Society of Mechanical Engineers, is the chairman of the committee on admission of exhibits for the American Museum of Safety Devices and Industrial Hygiene, which occupies the entire fifth floor at 231 West 39th Street, New York. The museum desires exhibits of devices and processes for safeguarding life and limb in connection with woodworking machinery, railway and marine transportation, mining, agriculture, manufacturing of all kinds. One exhibit already consists of specimens of fifty different kinds of dusts, illustrating the occupational diseases; accompanying each is a photograph of a microscopic section of the lungs showing the effect on the worker of coal, iron, brass, steel, wood, and other dusts. There are also wax models of lungs and hands illustrating those occupational diseases which attack the bones and skin. All exhibits accepted by the committee on exhibits will be eligible for the gold medal offered by the SCIENTIFIC AMERICAN for the best device, exhibited at the museum, for safeguarding life and limb. All inquiries regarding exhibits should be sent to Dr. W. H. Tolman, director, 231 West 39th Street, New York.

HABITS OF THE TARANTULA.

BY C. L. REDMISON.

The great tarantula of the southwestern part of the United States, like many another poisonous creature, as well as some that are quite harmless, is much maligned. It is not aggressive upon man, nor is it often intrusive, though many an old miner or prospector has "shaken them out of his blankets or boots in the morning." Strange to say, tarantulas thus dislodged are usually "the size of a saucer."

It is often stated that the spider frisks about in the sunshine on the hot sands of the desert, but in reality it avoids sunshine when it is hot, and remains well down in its burrow in the ground. About sundown, it comes up to the opening and lies in wait just below the surface. It assumes this position whether it desires food or wishes only to get a bit of fresh air. It does not travel about in quest of food, even when hungry, but remains quietly in the attitude described, often for hours at a time. At the near approach of a caterpillar, grasshopper, beetle, or almost any creature of like size, other than its enemy the wasp, it rushes out and seizes it; but rarely goes farther than a few inches from the opening. Should the prey, when first arrested, simulate death, which often is the case, since usually it is not at once wounded, the spider, unless it is very hungry, remains quiet until the insect moves, when the needle-pointed fangs are thrust into it. By pausing, it learns the nature of the object seized. The spider then retreats with it into its burrow, to feast, where the prey is ground up by the powerful mandibles, and the liquid portion upon which the spider subsists, is sucked out. One fair sized insect a week is sufficient to satisfy its hunger, because of its inactive existence while it can live several months without food, even when most active, provided it has water. The spider will fight and destroy its own kind, but when equally matched the combatants spar for an advantage and rarely clinch unless one relinquishes its vigilance, when the other buries its fangs in it. It does not then relinquish its hold until the helpless captive dies of paralysis, induced by the poison injected. Death results in ten or twenty minutes. There are approximately seven or eight females to each male. The adult males are highly energetic and unlike their phlegmatic mates cannot be kept long in confinement. They wear themselves out in ceaseless endeavor to escape. This startling degree of activity is an essential attribute, since the females live often remote from one another and take no initiative in the courtship.

The tarantula does not dig its own tunnel. It takes possession of some deserted burrow, usually that of a pocket gopher, which to the adult spider seems highly satisfactory. These burrows run, for the most part, horizontally, but the spider enters through a short vertical shaft. The burrows are two or three inches in diameter, but the spider at once restricts the entrance nearly to the diameter of its own body. It does this in a singular and interesting manner, affording a striking example illustrating the wide resourcefulness of lowly creatures. The spinnerets are two flexible and movable processes upon the under side of which are long rows of pores from which the silk is drawn out in a multiplicity of frail threads. With these organs, free particles of earth on the floor of the burrow are covered with a frail gauze which is then wadded together, along with much of the loose earth, which adheres to it. The wad is then carried up and pressed against the vertical wall, where it adheres, when it is further secured in place with more silk. The wads may be a half inch in diameter, and often many are required to finish the task.

In autumn, the spider closes the entrance completely in this manner, frequently using a large quantity of material. It is then ready to pass the winter in a semi-lethargic state, partaking of no food. In the spring it digs its way out. If the burrow is still in good condition it is cleaned out, the refuse being placed in a circle about the opening, where it renders the abode conspicuous. If the burrow proves untenantable another one is sought at once. There is evidence tending to show that the spider does not seek another habitation as long as the old one is suited to its needs; and quite often a number have been found that had lived at least three years in one place, judging by the number of discarded skins of successive size found in the burrow. During the growth of the tarantula, which requires about twenty years, it sheds its entire skin once each year—in midsummer. The event is an important one to the spider, and as it is then quite helpless, the entrance is previously closed by a sheet of silk drawn across it inside the aperture.

In June two or three hundred eggs are deposited in a mass which is at once covered with silk by the parent, unlike that of the trapdoor spider, is not lined with silk; therefore to guard the eggs against contamination, while they are incubated, the spider first incloses itself in a silk bag, sufficiently large to allow it to turn around freely. I know of but this feature has not before been described. The discovery was made by watching spiders in captivity, from time to time brief inspections having been made at suitable intervals. The subject's aversion to light and to being disturbed at this period is quite apparent, and the habituated or too frequent inspection causes it to abandon the task, so the entire operation cannot be observed from a single spider. Unless it is captured within a few days of the time that the cocoon is to be made, the spider makes no effort whatever to preserve the eggs. The large envelope inclosing the spider is quite frail, but its distension is insured by attachments to the wall of the burrow; and while it is very thin, it is so closely woven that the finest dust is excluded. The floor of this silken cell is raised a little above the floor of the burrow. Soon after the egg mass is properly inclosed in its covering, the fabric inclosing the spider is torn away. The finished cocoon is over an inch in diameter and shaped like a depressed globe. The young emerge from the cocoon in midsummer, and after shedding their skins, are found to be in the main hopefully divested of their wings. They remain during the summer in the maternal domicile, seemingly a happy family; but in autumn they leave, one by one, each seeking some hole suited to its size, which it proceeds to clean out and barricade in conventional manner. Nature will favor two, perhaps and of a mere hundreds and protect them until they die of old age at the end of twenty-five or thirty years.

OFFICIAL METEOROLOGICAL SUMMARY, NEW YORK, N. Y., DECEMBER, 1907.

Atmospheric pressure: Highest, 30.13; lowest 29.16; mean, 30.01. Temperature: Highest, 58; date, 23d; lowest, 19; date, 7th; mean of maximum, 44; date, 10th; coldest day, 25; date, 5th; mean of minimum for the month, 14; mean of minimum, 32; absolute mean, 37.8; normal, 34.1; excess compared with the mean of 37 years, +3.7. Warmest mean temperature of December, 42, in 1891. Coldest mean, 25, in 1876. Absolute maximum and minimum for the month for 37 years, 68 and 6. Average daily deficiency since January 1, —616. Precipitation, 2.91; greatest in 24 hours, 1.35; date, 11th and 12th; average of this month for 37 years, 3.32; Excess, —0.05. Accumulated excess since January 1, +5.74. Greatest December precipitation, 6.66, in 1881; least, 0.95, in 1877. Snowfall, 4.4. Wind: Prevailing direction, west; total movement, 10,119 miles; average hourly velocity, 14 miles; maximum velocity, 56 miles per hour. Weather: clear days, 7; partly cloudy, 13; cloudy, 11. On whole inch or more of precipitation occurred on 8th to 12th. Fog (dense) 23d 30th.

THE CURRENT SUPPLEMENT.

The current SUPPLEMENT, No. 1671, contains an unusual number of instructive and interesting articles. Allan Wells and others describe the recent advances which have been made in reinforced concrete engineering. How concrete waste may be utilized is a technological consideration of value. Within recent years the use of mechanical devices for propulsional purposes has developed markedly. The most recent evidences of this kind has been described in the English supplement of the SCIENTIFIC AMERICAN under the title of "A New Agricultural Oil Motor." W. H. Booth contributes a very good criticism of the gas engine cycle. Sir William Ramsay, well known for his discovery of helium and his recent radioactive investigations, writes a semi-popular article on the effect of cooling emanation, in which article he briefly dwells upon his recent discovery that radium emanation has the marvelous property of decreasing certain elements. One of the most helpful articles which has appeared in the SUPPLEMENT for a long time is one from the pen of the Paris correspondent of the SCIENTIFIC AMERICAN, in which he describes the recent French aeronautical contests. As most of us know, French engineers have produced types of motors which are extremely light and very efficient, in fact engines which fall but very little short of the ideal prime mover for the aeroplane and the dirigible balloon. For this reason the article in question should be read by all aeronautical experimenters.